UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/717,567	11/21/2000	Paul A. Kohl	BFGBP0217US	2128

28862 7590 12/14/2004

HUDAK, SHUNK & FARINE, CO., L.P.A.
2020 FRONT STREET
SUITE 307
CUYAHOGA FALLS, OH 44221

EXAMINER	
MITCHELL, JAMES M	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/717,567	KOHL ET AL.	
	Examiner	Art Unit	
	James M. Mitchell	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2004* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *43-73* is/are pending in the application.

4a) Of the above claim(s) *43-58* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *59-73* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This office action is in response to applicant's arguments filed September 20, 2004.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the conductive material not extending below the relatively adjacent air gaps in claim 67must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 67 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in the original disclosure of the conductive material not extending below the relatively adjacent air gaps. While applicant cited to page 19, lines 17-22 of it specification for support in its amendment

filed May 22, 2003, neither the cited page that discloses "...non conductive material that does not extend..." nor applicant's arguments support claim 67.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 59-65, 68-70, 72 and 73 are rejected under 35 U.S.C. 102(e) as being anticipated by Fulford Jr et al. (U.S. 6,376,330).

7. Fulford discloses a semiconductor device comprising: a substrate (10), a layer of conductive material disposed on the substrate and having a region thereof bordered by air gaps (24); and an overcoat layer (22) overlying the patterned layer of conductive material and the air gap, the overcoat layer having a portion thereof overlying the conductive material in the region bordered by the air gaps, and said portion extending below the height of the adjacent air gaps; wherein the conductive material in the region bordered by the air gaps forms electrical connection points (i.e. "interconnect lines"; Col. 1, Lines 9-10) and therefore are leads conductive lead of the semiconductor device; and the layer of conductive material includes a plurality of regions bordered by respective air gaps, and the overcoat layer has portions thereof overlying the conductive material in the regions bordered by the air gaps, and said portions extend

below the height of relatively adjacent air gaps; wherein the overcoat layer includes a dielectric material (Abstract); and a surface of the conductive material adjacent a respective air gap is covered by a film of non-conducting material (16); formed of non-conducting material is SiO2 or TiO2 (Col. 4, Line 43); and the film of non-conducting material inherently controls corrosion (via SiO2) of the surface of the conductive material covered by the film; with said semiconductor device comprising:
a substrate, a patterned layer of conductive material disposed on the substrate and having a region thereof bordered by air gaps; and an overcoat layer overlying the layer of conductive material and the air gap, the overcoat layer having a portion thereof overlying the conductive material in the region bordered by the air gaps; and wherein a surface of the conductive material adjacent a respective air gap is
covered by a film of non-conducting material that does not extend over the conductive material beyond the air gap.

8. Although Fulford has the same structure as that claimed, Fulford does not appear to explicitly disclose the process limitation "such as" the conductive layers being patterned and the semiconductor device formed by removing a sacrificial material from a pre-cursor made in accordance with a "method comprising the steps of: (A) forming a patterned layer of the sacrificial material on a substrate corresponding to a pattern of air gaps to be formed in the semiconductor structure..." "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious

from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 66 and 71 rejected under 35 U.S.C. 103(a) as being unpatentable over Fulford Jr et al. (U.S. 6,376,330).

11. Fulford discloses the elements stated in paragraphs 6 and 7 of this office action, but does not appear to explicitly disclose that the non-conducting material has a thickness of about 100 â.

12. It would have been obvious to one of ordinary skill in the art to form the non-material with a thickness of 100 angstrom, because Fulford discloses that the non-conducting material may vary (Col. 4, Lines 44-48)

13. Furthermore, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere

dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Response to Arguments

14. Applicant's arguments have been considered but are found unpersuasive as amended. Applicant contends that because newly added claims 72 and 73 include the limitations of the nonelected species they are linking claims and therefore the nonelected species must be searched as well and the restriction withdrawn is unpersuasive. The allegedly linking claims are based on **how the semiconductor** is **formed**, wherein the intermediate layers are no longer in the final product, which is critical to the **elected species**. For example, there is no "sacrificial material" in the claim 59, which reflects the elected species. While claim 72 and 73 that depend on claim 59 does indeed include the recitation of a sacrificial layer, it does so in the context of a process needed to form the final product (the elected species). As indicated in the office action the process does not carry patentable weight if it does not impart structural limitations that are apart of the final product. Because for example the sacrificial layer is not apart of the final product, a search for a sacrificial layer is unnecessary and would

not overlap a search for a product that has "no sacrificial layer." The restriction is deemed proper and examiner is not persuaded by the allegation of linking claims.

15. In regards to applicant's traversal to examiner's drawing objection. Applicant contends that Figure **2F** shows that "the conductive material does not extend **below the height** of relatively adjacent air gaps." Examiner disagrees. The plain and ordinary meaning of height is the highest position, therefore in order for Fig 2F to disclose the claim limitation, conductive material 34 either has to be level with the air gap or above the air gap. As shown in Fig. 2F, item 34 is clearly below the air gap's **height**. As such, examiner is unpersuaded that support for the added claim is found in the drawing and is deemed new matter.

16. Lastly, applicant contends that its invention is patenatable, because allegedly the prior art does not show an overcoat having portions that **overlay** the conductive material. Examiner respectfully disagrees. The plain and ordinary meaning of overlay only requires a layer laid at a position above the conductive material; Item 22 of the prior art is clearly shown if Fig 5 as being laid at a position above the conductive material. Examiner is unpersuaded by applicant's argument and the claim deemed anticipated by the prior art.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jmm

CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

November 29, 2004